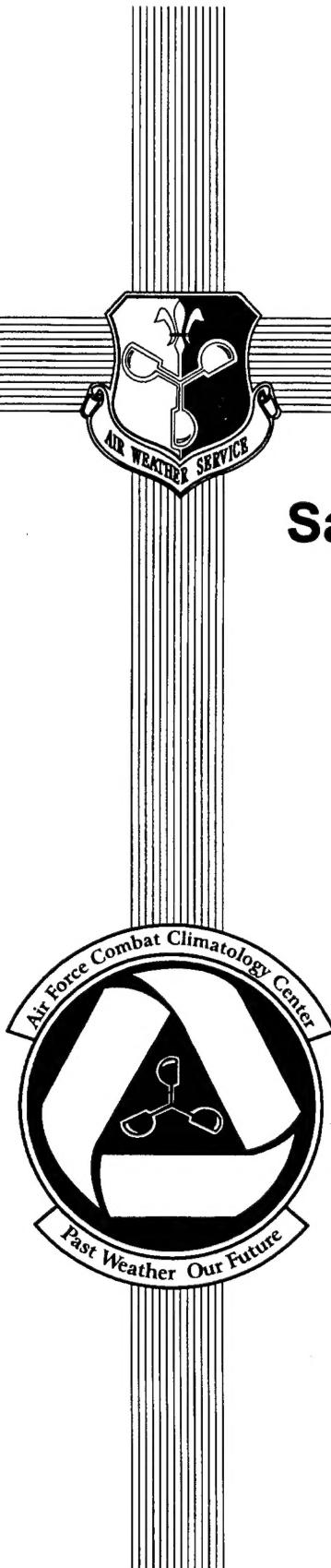


AFCCC/UH-96/004



Satellite Derived Vertical Moisture Database Users Handbook

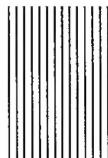
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MARCH 1996

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REVIEW AND APPROVAL STATEMENT

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PREFACE

AFCCC/UH—96/004, *Satellite Derived Vertical Moisture Sounding Database User's Handbook*, provides users of upper-air moisture data with a description of the format OL-A, AFCCC uses to store data obtained from Special Sensor Microwave/Temperature (SSM/T-1 and SSM/T-2), Special Sensor Microwave Imagery (SSMI), and Vertical Temperature Profile (VTPR) sensors on DMSP and NOAA satellites. In additon, this handbook describes the quality control conducted on data.

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SATELLITE DERIVED VERTICAL MOISTURE SOUNDING DATABASE

Chapter 1

INTRODUCTION

1.1 Purpose. The purpose of the Satellite Derived Vertical Moisture Sounding Database Users Handbook is to provide the user with a general description of the database, to provide specific information concerning the format used to store the data, and to give a brief description of the processing and quality control used in building the database.

1.2 Background. The Satellite Sounding (SS) Database includes pressure and moisture data derived from the Special Sensor Microwave/Temperature (SSM/T-1 and SSM/T-2), Special Sensor Microwave/Imagery (SSM/I), and Vertical Temperature Profile (VTPR) sensors on-board Defense Meteorological Satellite Program (DMSP) and National Oceanic and Atmospheric Administration (NOAA) satellites. Operating Location A, Air Force Combat Climatology Center (OL-A, AFCCC) Asheville, N.C., has the responsibility for building and maintaining a database that contains SSM/T-2 data (pressure and moisture only) in support of the Atmospheric Slant Path Analysis Model (ASPAM) at AFCCC, Scott AFB, Ill. The SS database can be used for other applications at AFCCC as well as by other Department of Defense (DoD) and civilian customers.

The SS database contains moisture data (relative humidity) at different pressure levels. Approximately

300,000 worldwide observations are made daily. Approximately 30 megabytes of SS data are transmitted per day per satellite to OL-A, AFCCC from Air Force Global Weather Central (AFGWC), Offutt AFB, Neb., via the Global-ETAC-OL-A Network (GEON). The data undergoes quality control and final climatic database build at OL-A. OL-A transmits SS data to AFCCC via GEON in support of ASPAM processing.

1.3 Data Ordering Procedures. DoD customers can obtain SS data by submitting requests in accordance with AFI 15-118 or Department of the Army Pamphlet 115-1. Non-DoD customers should submit requests to the National Climatic Data Center (NCDC), Federal Building, 151 Patton Ave, Asheville, NC 28801-5001. Data is normally provided to customers in the database format specified by this handbook; that is, on 6,250 BPI magnetic tape in 8-bit character format or on 37,871 BPI cartridge tape.

1.4 Questions and Comments. Send questions or comments concerning the *Satellite Derived Vertical Moisture Sounding Database* to OL-A, AFCCC, Federal Building, 151 Patton Ave, Room 120, Asheville, NC 28801-5002 (DSN: 266-3100, commercial: (704) 271-4216).

SATELLITE DERIVED VERTICAL MOISTURE SOUNDING DATABASE

Chapter 2

DATABASE DESCRIPTION

2.1 Database Construction. OL-A, AFCCC maintains the database on magnetic tape media cartridge tapes in monthly files. Each data record is fixed length, 84 ASCII characters. Data records are blocked 8,148 characters. The data records are sequenced by YEAR-MONTH-DAY-HOUR-MINUTE-LATITUDE-LONGITUDE-SATELLITE SOURCE ID-SATELLITE SENSOR ID.

2.2 Database Format Introduction. Data for each observation consists of date, time and source information followed by data for each mandatory level. Currently, only six levels (300, 400, 500, 700, 850, and 1,000 mb) are reported. The database may be expanded to hold additional levels in the future.

The following general comments apply to the SSM/T-2 vertical moisture sounding format:

- Each field is in 8-bit ASCII character format.
- Reserved fields are coded as ASCII character "9s."
- Analysts must avoid trying to obtain more accuracy from the data than was originally observed.

2.3 Database Formats. The actual format is listed in Chapter 4. Section 4.2 describes the ID (date, time, and source) information and section 4.3 describes the mandatory level data format information.

Chapter 3

OL-A, AFCCC DATA PROCESSING AND QUALITY CONTROL

3.1 Processing. Processing of satellite sounding data at OL-A, AFCCC consists of the following:

- Ensuring the format of the data is good and performing an inventory of the incoming data over GEON from AFGWC.
- Performing quality control for any missing levels and erroneous fields. For example: records containing errant ID elements (characters 1-28) and data fields out of range (characters 29-84).
- Shipping data twice daily over GEON from OL-A, Asheville, N.C., to AFCCC, Scott AFB, Ill.
- Archiving data by pulling down from disk to five or six cartridge tapes at the end of the month.

3.2 Quality Control. Records with errant ID elements (characters 1-28 out of range) are rejected and are written to an error file for subsequent interrogation by an analyst. Data fields (characters 29-84) out of range are set to missing in the database and the records containing these fields are retained in the database and are written to the error file for further quality control analysis.

3.3 Database Period of Record. The SSM/T2 database archival started in April 1995. However, due to satellite problems, the database build was stopped Nov. 11, 1995, at 0600Z. Database build will continue once AFGWC resumes shipment of the SSM/T2 database. The overall quality of the database is good, but there are occasional hours with missing or low data counts.

SATELLITE DERIVED VERTICAL MOISTURE SOUNDING DATABASE

Chapter 4

DATA FORMATS

4.1 GENERAL INFORMATION. All information about each sounding is contained in a single 84 character record. Each sounding contains an ID section and a data section.

4.2 ID SECTION.

FIELD NO.	1	2	3	4	5	6	7	8	9
DATA FIELD	YEAR OBS	MON OBS	DAY OBS	HR OBS	MIN OBS	LAT. OBS	LONG. OBS	SAT SOURCE ID	SAT SENSOR ID
# CHARS	XXXX	XX	XX	XX	XX	XXXXX	XXXXXX	XXXX	X
CHAR LOC	1-4	5-6	7-8	9-10	11-12	13-17	18-23	24-27	28-28

FIELD NO	CHAR LOC	VALUE RANGE	DESCRIPTION OF FIELD AND COMMENTS
1	1-4	0000-9999	YEAR_OBSERVATION. Year of observation.
2	5-6	01-12	MONTH_OBSERVATION. Month of the year.
3	7-8	01-31	DAY_OBSERVATION. Day of month
4	9-10	00-23	HOUR_OBSERVATION. Hour of day.
5	11-12	00-59	MINUTE_OBSERVATION. Minute of hour.
6	13-17	-9000 to -0001 +0000 to +9000	LATITUDE. Latitude to hundredths of degrees scaled by 100. South latitudes are negative.
7	18-23	-17999 to -00001 +00000 to +18000	LONGITUDE. Longitude to hundredths of degrees scaled by 100. East longitudes are negative.
8	24-27	NO00-NO99 GW00-GW99	SATELLITE_SOURCE_ID: Identifier for source satellite of vertical moisture soundings as follows: NO00-NO99 = NOAA satellite GW00-GW99 = DMSP satellite
9	28-28	1,2,3,4	SATELLITE_SENSOR_ID Indicates satellite sensor as follows: 1 = SSM/T-1 (DMSP) 2 = SSM/T-2 (DMSP) 3 = SSM/I (DMSP) 4 = VTPR (NOAA)

CHAPTER 4

4.3 DATA SECTION.

FIELD NO.	10	11	12	13	14	15	16-25	26
DATA FIELD	QUAL FLAG SOUND	ATMOS TYPE SOUND	SFC TYPE	NUM LEVELS SAT	PRESS LEVEL X	REL HUM LEVEL X	**	RES
# CHARS	X	XX	X	XX	XXXXX	XXX	XXXXX, XXX	XX
CHAR LOC	29-29	30-31	32-32	33-34	35-39	40-42	43-82	83-84

** Fields 14 and 15 are repeated for each level
(Field 16-25, char loc 43-82).

<u>FIELD NO</u>	<u>CHAR LOC</u>	<u>VALUE RANGE</u>	<u>DESCRIPTION OF FIELD AND COMMENTS</u>
10	29-29	1, 2	QUALITY_FLAG_SOUNDING. Indicates the overall quality of the sounding, as follows: 1 = No cloud contamination in sounding 2 = Cloud contamination or suspect data within sounding
11	30-31	01 to 25, 99	ATMOSPHERIC_TYPE. Indicates the atmosphere type used in the derivation of the satellite sounding: 01 - 05 = Ocean 06 - 08 = Land at 0 meters 09 - 11 = Land at 1500 meters 12 - 14 = Land at 3000 meters 15 - 17 = Land at 4500 meters 18 - 20 = Land at 6200 meters 21 - 22 = Sea-Ice 23 - 25 = Coast 99 = Missing
12	32-32	1 - 4, 9	SURFACE_TYPE. Identifies the surface type at the sounding location, as follows: 1 = Ocean 2 = Land 3 = Sea-Ice 4 = Coast 9 = Missing
13	33-34	01 to 99	NUMBER_OF_LEVELS_SAT. Identifies the number of levels within the sounding.

DATA FORMATS

14	35-39	00100 to 11000	PRESSURE_LEVEL-1. Pressure level in tenths of Millibars scaled by 10.
15	40-42	000 to 100, 999	RELATIVE_HUMIDITY_LEVEL_1. Relative humidity in percent for level identified above. 999 indicates missing.
16-25	43-82	Same as 14 and 15	PRESSURE_LEVEL_X AND RELATIVE_HUMIDITY_X. Same as fields 14 and 15 respectively, but repeated for levels 2-6.
26	83-84	99	RESERVED.